

P150. Anti-calcification Modification Of Ga-fixed Bovine Jugular Wall With Tannic Acid

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OBJECTIVES: Glutaraldehyde-fixed bovine jugular vein (BJV) is currently used in infant cardiovascular surgery. However, severe calcification in the BJV wall limits long-term function. In this study, tannic acid (TA) was employed to mitigate calcification.

METHODS: Bovine jugular veins were fixed in 0.6% GA prior to immersion in 0.3% TA solution for four days (TA-group). BJVs without TA treatment served as control (Control). A subcutaneous SD rat model was employed to evaluate mineral accumulation in the explanted veins after 21 days and 60 days respectively. Calcification levels were analyzed by atomic absorption spectrometer and verified by von Kossa staining. In vitro properties of the treated BJV were characterized by shrinkage temperature, mechanical strength, resistance to enzymatic digestion and elastin content.

RESULTS: The calcium deposits were significantly lower in TA-group compared to controls at both time points. These results were confirmed histologically. GA-fixed BJV with additional TA treatment resulted in higher shrinkage temperature, increased resistant to enzymatic digestion and stronger in tensile strength. TA treatment retained more elastin in BJV tissues after implantation.

CONCLUSIONS: Additional treatment with tannic acid to glutaraldehyde fixed bovine jugular vein results a significant reduction of calcification in a subcutaneous rat model. Additional TA treatment improved biochemical and mechanical properties.

Properties of treated bovine jugular vein

	TA	GA	P (n=10)
Shrinkage Temp. (°C)	89.5±0.5	88.5±0.6	<0.01
Weight Loss (% collagenase)	4.2±0.97	19.7±1.84	<0.01
Weight Loss (% elastase)	5.1±0.99	29.1±2.9	<0.01
Calcification(21d)	2.91±0.82	35.03±9.58	<0.01
Calcification(60d)	6.64±1.91	111.56±19.80	<0.01
Elastin Retaining (21D)	112.9±12.8	54.8±12.0	<0.01
Elastin Retaining(60D)	97.6±9.8	19.6±7.8	<0.01

Illustration of Calcium Accumulation.

